

Compact Modular Flash LIDAR, Phase I

Completed Technology Project (2018 - 2019)



Project Introduction

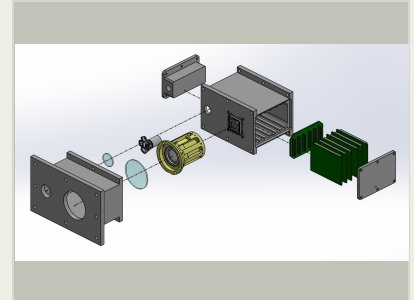
The need for a space qualified Flash LIDAR that can be configured without significant requalification for Sample Capture, EDL and other GN&C activities has become clear, furthermore improvements in SWaP will enable more applications. To meet the need for a cost effective, compact LIDAR for multiple missions, ASC is proposing to leverage the high TRL design of the OSIRIS-REX LIDAR, but redesign the layout of the electronics and mechanical system into a system architecture that is easily configurable and significantly more compact. The Ultra-Compact Modular Flash LIDAR (UCML) developed under this effort could be retested for environments to maintain a high TRL so that it can be easily adopted by a wide range of missions with minimal requalification. The redesign would also allow for an interchangeable optics module that can be designed with a mission specific Field of View (FOV). The mechanical system would also be designed to interface with multiple laser modules and be significantly lighter and more compact. Currently ASC is producing lasers for space missions from 0.5 mJ to 18 mJ with wavelengths of 1064nm and 1570nm and has demonstrated energies up to 60mJ. The resulting LIDAR could be as small as 5"x5"x6" and could be configured with lasers up to 60mJ with virtually any FOV(F)Vs of 1 to 180 degrees have been demonstrated). The new LIDAR would be more robust and significantly easier to manufacture reducing cost and schedule risks to future NASA programs

Anticipated Benefits

The modular approach to the LIDAR development will allow for improved cost and schedule for space programs requiring LIDAR. The LIDAR can be used for any number of GN&C and mapping applications such as:

*Rover Mobility and Navigation, *Topographical Mapping, *Mars Landed Exploration, *Exploration of Moons (ALHAT, Jupiter Icy Moons), *Asteroid and Comet Rendezvous and Sample Return, *ISS Rendezvous and Docking, *Space Situational Awareness, *Rock Abundance and Distribution Maps

Applications include Collision Avoidance, Helicopter landing in BrownOut conditions, Mid-Air Refueling, Surveillance, Terrain Mapping, Autonomous Navigation for UGVs, unmanned surface vehicles (USVs) and UAV, Smart intersection, LIDAR brakes, Robotics, Machine Vision, Hazard Material Detection and Handling, Underwater 3D Imaging, Sub Nanosecond Dynamic Imaging, 3D Sports Imaging and data transmission, consumer electronics. The applications continue to develop.



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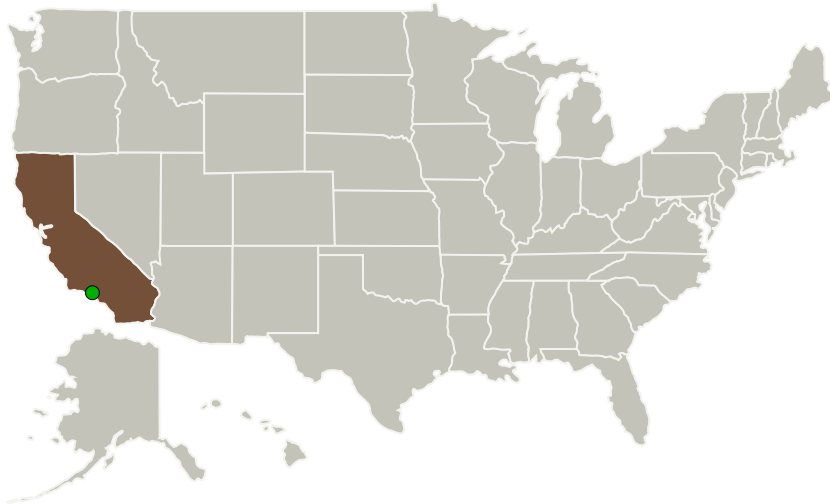
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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Advanced Scientific Concepts, Inc.	Lead Organization	Industry	Goleta, California
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations

California

Project Transitions

**July 2018:** Project Start**February 2019:** Closed out**Closeout Documentation:**

- Final Summary Chart(<https://techport.nasa.gov/file/141312>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Advanced Scientific Concepts, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

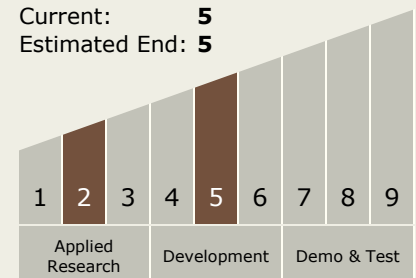
Leona M Gonzalez

Technology Maturity (TRL)

Start: 2

Current: 5

Estimated End: 5

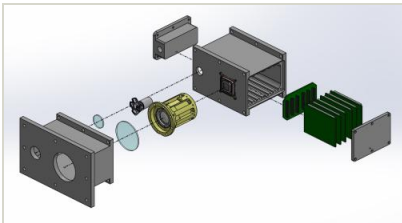


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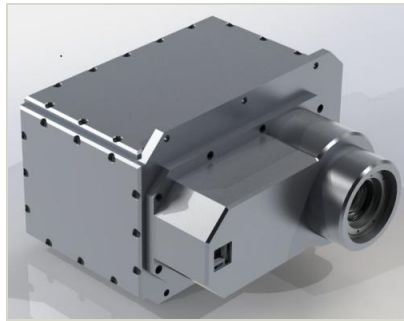
Images



Briefing Chart Image

Compact Modular Flash LIDAR,
Phase I

(<https://techport.nasa.gov/image/129204>)



Final Summary Chart Image

Compact Modular Flash LIDAR,
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(<https://techport.nasa.gov/image/125871>)

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
 - └ TX05.5 Revolutionary Communications Technologies
 - └ TX05.5.2 Quantum Communications

Target Destinations

Earth, The Moon, Mars